

CORIX MULTI-UTILITY SERVICES INC.
RESPONSE TO
BC SUSTAINABLE ENERGY ASSOCIATION AND SIERRA CLUB BC
INFORMATION REQUEST NO. 1
BURNABY MOUNTAIN DISTRICT ENERGY UTILITY - CPCN APPLICATION

1.0 Topic: Biomass

Reference: Exhibit B-1, p.2, pdf p.9; Table 1: Addressing BC Energy Objectives, p.13, pdf p.19; p.27, pdf p.34; p.51, pdf p.58; Burnaby Mountain District Energy Utility Project, Discussion Guide, November 15, 2016, pdf p.74; Newspaper Ad, Public Open House – November 16 [2016], pdf p.86; pdf p.152, pdf p.211, pdf p.263

“The biomass used in the CEP will be sourced locally and will meet Metro Vancouver’s wood waste quality and composition requirements.” [p.2]

1.1 Please define “locally” in the phrase “sourced locally.”

CORIX RESPONSE:

Cloverdale Fuel Ltd. was selected pursuant to a competitive process as the preferred supplier of the biomass. The biomass fuel will be delivered to the CEP from Cloverdale Fuel’s yard located in Port Kells, Surrey.

1.2 What are Metro Vancouver’s wood waste quality and composition requirements? Please provide copies of the relevant documentation.

CORIX RESPONSE:

Metro Vancouver defines “biomass” and its quality requirements in the Greater Vancouver Regional District Boilers and Process Heaters Emission Regulation Amending Bylaw No. 1190, 2013. A copy of the by-law is provided for reference in Attachment I.

“The project will use local wood waste (biomass) that could include urban wood waste from tree cuttings and trimmings, uncontaminated wood waste such as wood chips from sawmills, shavings, hog fuel (an unprocessed mix of bark and wood fiber), and clean construction wood waste.” [p.13, underline added]

“The project will use locally-sourced wood waste that is no longer accepted at local landfills including tree cuttings and trimmings, clean wood waste such as wood chips from sawmills, shavings, hog fuel (an unprocessed mix of bark and wood fiber), and clean construction wood waste.” [p.27, pdf p.34, underline added]

“Local sources and availability - utilization of clean wood waste that is banned via Metro Vancouver bylaws from local landfills. Evaluate supply diversification utilizing multiple local suppliers, while managing the fuel quality.” [p.51, pdf p.58, underline added]

“Biomass fuel for the project will be clean wood waste, such as wood chips, shavings, urban, and clean construction wood waste, and will be sourced locally and delivered to the site during off-peak traffic hours. The use of local wood waste supports Metro Vancouver’s clean wood recycling policy by re-using clean construction and urban wood waste banned from Metro Vancouver

landfills in 2015.” [Burnaby Mountain District Energy Utility Project, Discussion Guide, November 15, 2016, pdf p.74]

“The project will use locally sourced clean wood residuals to provide heat and domestic hot water to Burnaby Campus Buildings and the UniverCity residential community at SFU.” [Newspaper Ad, Public Open House – November 16 [2016], pdf p.86, underline added]

“Biomass fuel for the project will be clean wood waste, such as wood chips and shavings, as well as urban and clean construction wood waste, which will be sourced locally and delivered to the site during off-peak traffic hours.” [pdf p.107, underline added]

“Biomass fuel for the project will be clean wood waste, such as wood chips, shavings, urban, and clean construction wood waste.” [Presentation to City of Burnaby, slide 9, pdf p.118, underline added]

“Biomass” is defined the same way in each of the Amended and Restated Thermal Energy Services Agreement, the Amended and Restated Infrastructure Agreement, and the form of Statutory Right of Way. The definition is:

“Biomass” means uncontaminated wood waste, including mill ends, wood chips, shavings, sawdust, sander dust, clean demolition and construction wood waste, park trimmings and hog fuel.” [pdf p.152, pdf p.211, pdf p.263, respectively, underline added]

- 1.3 Please confirm, or otherwise explain, that only fuel that meets the definition of “biomass” in the TES Agreement, the Infrastructure Agreement and Statutory Right of Way is allowed to be burned in the CEP.

CORIX RESPONSE:

Yes, that is correct.

- 1.4 The description of the biomass feedstock for the CEP is worded somewhat differently in various places in the application. Does this reflect substantive differences or is it simply different wording of the same concept? What is the authoritative definition of the allowable biomass feedstock? Is it the definition in the two agreements and the statutory right of way?

CORIX RESPONSE:

No, the somewhat different wording does not reflect substantive differences. Certain words were used interchangeably to reflect the same concept. For example, clean and uncontaminated. The biomass fuel will comply with the definition of “biomass” included in the Metro Vancouver Bylaw noted in IR 1.2 above.

- 1.5 Please confirm that the biomass used in the CEP will not include rail ties treated with creosote or pentachlorophenol.

CORIX RESPONSE:

Confirmed.

- 1.6 Would Corix object to a condition of the CPCN that the CEP will not include rail ties treated with creosote or pentachlorophenol?

CORIX RESPONSE:

Corix would not object to such condition.

2.0 Topic: Demand-Side Management
Reference: Exhibit B-1

- 2.1 Does Corix see itself as responsible for encouraging customers to undertake energy conservation and efficiency measures? If so, will Corix prepare and file a long term demand-side management plan and corresponding DSM expenditure schedules? If not, why not?

CORIX RESPONSE:

Corix encourages customers to use energy wisely and to reduce energy consumption where possible.

Energy conservation programs generally target physical upgrades to buildings and equipment, and/or attempt to influence customer behaviour. Given that both the utility's infrastructure and the buildings and equipment at UniverCity are recently constructed and meet or exceed current efficiency standards, there are few, if any, cost effective opportunities for energy efficiency upgrades to buildings and equipment.

To increase awareness of the utility's energy service and encourage energy efficient behaviour, Corix provides its customers with energy information pertinent to the space and domestic water heating services the utility provides. To this end, Corix operations staff have met with each of our customers, the strata management committees, and through detailed discussions provided information on how they can conserve energy and reduce their energy bills. Corix has also recently posted information on its website providing customers with suggestions on how to use energy wisely (<http://www.corix.com/nus-at-univercity/news-and-service-notice/conservation-tips>).

Corix believes that its current energy conservation efforts, which are included as part of Corix's general service provision to customers, are a prudent approach given the size, age and nature of the utility. At this time, Corix does not believe undertaking the development and filing a demand-side management plan is of value.

- 2.2 Please explain what if any energy conservation and efficiency assumptions are included in the load forecast.

CORIX RESPONSE:

The energy demand forecast is based on historical consumption patterns experienced by the utility to date, which we assume include the impacts of past customer information programs directed at encouraging energy conservation as noted in our response to IR 2.1 above.

3.0 Topic: GHG emissions reduction
Reference: Exhibit B-1, Table 1, p.13, pdf p.20

"By utilizing the biomass CEP, the implementation of the Burnaby Mountain DEU will result in an estimated reduction in overall GHG emissions of 11,600 tonnes / year."

- 3.1 Please provide the detailed calculation of the estimated reduction in overall GHG emissions, i.e., including the carbon intensity of both the proposed CEP and the assumed alternative.

CORIX RESPONSE:

Please see response to BCUC IR 3.1 (Document B-2).

- 3.2 Please include the source(s) for the carbon intensity of the heat energy to be provided by the DEU using the biomass CEP as proposed.

CORIX RESPONSE:

Please see response to BCUC IR 3.1 (Document B-2).

**4.0 Topic: Load growth
Reference: Exhibit B-1**

- 4.1 What are Corix's contingency plans in the event that load growth exceeds the forecast?

CORIX RESPONSE:

Corix has included allowance for an additional 3 MW natural gas boiler in the CEP to provide for load growth at UniverCity. Other resource options could be explored depending on the magnitude and timing of load growth, and the forecast costs of different resources under policy and market conditions at the time of need. Corix's obligation to SFU is established in contracted capacity. If SFU is ever interested in increasing their subscribed capacity, it would be dealt with under the existing contractual arrangements between the parties, including the source of additional capacity.

**5.0 Topic: Energy Requirements of SFU Campus
Reference: Exhibit B-1, page 27**

"The Burnaby Mountain DEU will provide 85% of the energy requirements of the SFU Campus."

- 5.1 Does this refer to all energy requirements, including lighting, or only space and water heating requirements? Does it include space cooling requirements?

CORIX RESPONSE:

This refers to the thermal energy use for space heating and domestic hot water. It does not include electrical loads or any cooling requirements. SFU's cooling requirements are currently met by electric cooling towers. SFU's gas-fired heating plant currently accounts for 80% of the GHG emissions of SFU's Burnaby campus.

**6.0 Topic: Load Forecasting
Reference: Exhibit B-1, page 31, Figure 10 and Table 10**

Figure 10 shows a forecast of annual energy demand for UniverCity and SFU Campus to 2022. Table 10 shows energy demand forecast figures to 2023.

- 6.1 What is the expected operational life of the DEU?

CORIX RESPONSE:

The DEU will be operational in perpetuity.

- 6.2 Over what period of time does Corix expect to recover the capital costs of the DEU?

CORIX RESPONSE:

The capital costs will be recovered in rates by applying depreciation expense over the useful life of the assets. For forecasting purposes, the depreciation rates for the various asset types have been grouped and summarized as shown in Table 15 of the Application.

- 6.3 Why are energy demand figures only shown for five or six years into the future?

CORIX RESPONSE:

For modeling purposes, the assumption for energy demand is that it is constant (weather normalized) over the life of the project. The changes in the first five years are related to build-out of the UniverCity residential development. Once UniverCity is fully built-out and all projected buildings are connected to the DEU (2021), the energy demand forecast starting in 2022 is assumed to remain unchanged.

7.0 Topic: Fuel supply

Reference: Exhibit B-1, 7.4.2. Biomass Sourcing and Delivery

- 7.1 Please provide evidence to support a conclusion that it can be reasonably expected that a biomass fuel supply will be available in the requisite quantity and quality and within the assumed price range.

CORIX RESPONSE:

Corix completed a competitive process to select a fuel supplier offering the best overall value based on a number of factors, including the quality, quantity and pricing of the biomass fuel and operating history of the supplier. The preferred supplier was determined to be Cloverdale Fuel Ltd. Cloverdale Fuel is a local entity with more than 40 years' experience providing wood residues to the Lower Mainland market. Since 2014, they have been supplying wood waste fuel with stringent quality requirements to UBC's Bioenergy Research and Demonstration Facility. Corix is currently (i) negotiating an agreement for the supply of biomass with Cloverdale Fuel, and (ii) working on finalizing performance and price guarantees to be provided by Cloverdale Fuel.

ATTACHMENT I
VANCOUVER REGIONAL DISTRICT BOILERS AND PROCESS HEATERS EMISSION REGULATION
AMENDING BYLAW NO. 1190, 2013

See attached.

Greater Vancouver Regional District

Boilers and Process Heaters Emission Regulation Amending Bylaw No. 1190, 2013

A Bylaw to Amend "Greater Vancouver Regional District Boilers and Process Heaters Emission Regulation Bylaw No. 1087, 2008."

WHEREAS:

- A. The Board of Directors of the Greater Vancouver Regional District has adopted Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008; and
- B. That Bylaw contemplates that the Board of the Greater Vancouver Regional District may establish emission regulations.

NOW THEREFORE the Board of Directors of the Greater Vancouver Regional District in open meeting duly assembled enacts as follows:

- 1. "Greater Vancouver Regional District Boilers and Process Heaters Emission Regulation Bylaw No. 1087, 2008" is hereby amended as follows:

- (a) The definition of biomass in Section 4 is deleted in its entirety and replaced with the following:

"biomass" means:

- (a) wood or wood products;
- (b) uncontaminated wood waste, such as mill ends, wood chips, shavings, sawdust, sander dust, clean construction waste, hog fuel, and clean dimensional lumber from deconstruction;
- (c) manufactured wood fuel;
- (d) vegetative or agricultural products as specifically authorized by the district director;
- (e) organic matter used as fuel that has been demonstrated to the satisfaction of the district director to burn as cleanly as wood or uncontaminated wood waste;

but, unless otherwise authorized by the district director, does not include substances that contain any of the following:

- (f) glue, paint or preservative, or foreign substances harmful to humans, animals or plants when combusted;
- (g) wood, wood products, or wood waste with chloride content greater than 0.05 percent dry basis;
- (h) wood, wood products, or wood waste with moisture content greater than 60

percent dry basis;

- (i) manure;
- (j) recyclable post consumer waste;
- (k) paper or paper products; or
- (l) demolition waste other than clean dimensional lumber from deconstruction; or
- (m) other waste containing materials other than uncontaminated wood waste;

(b) The definition of deconstruction is added to Section 4 as follows:

“deconstruction” means demolition by systematic disassembly of a building or structure resulting in the reuse, recycling or recovery of a large proportion of the non-hazardous building materials;

(c) The definition of dimensional lumber is added to Section 4 as follows:

“dimensional lumber” means a wood product manufactured by sawing logs into rough size lumber or cants (square timbers) which are edged, resawn to final dimension and cut to length, and which is typically used in structural framing.

(d) The definition of performance tune-up is added to Section 4 as follows:

“performance tune-up” means the process of inspection, testing and maintenance procedures used to restore a boiler to its efficient state, given its age and other parameters;

(e) Section 20 is deleted in its entirety and replaced with the following:

20 In the event of an emergency or condition beyond the control of the operator which prevents the continuous use of any works required to meet the emission limits in sections 24 or 25, the operator must take appropriate remedial action, immediately notify Metro Vancouver at 604-436-6777, and take any other actions specified by the district director to protect the environment including stopping discharge of air contaminants.

(f) Section 21 is deleted in its entirety and replaced with the following:

21 (1) No operator of a boiler or process heater fuelled by biomass may discharge any air contaminant without submitting, for approval, a biomass fuel management plan as set out in Appendix 3.

(2) Every operator must adhere to the approved biomass fuel management plan at all times and provide records as may be required by the district director to demonstrate compliance with the plan.

(3) Biomass must be stored and handled in a manner that minimizes fugitive particulate matter emissions.

(g) Section 28 is deleted in its entirety and replaced with the following:

28 For boilers or process heaters fuelled by biomass, the minimum stack height must be 20 metres above ground level unless otherwise approved by the district director.

(h) Section 29 is deleted in its entirety and replaced with the following:

Air Quality Dispersion Modelling

29 (1) No operator of a boiler or process heater fuelled by biomass may discharge any air contaminant prior to conducting, at the operator's expense, dispersion modelling in accordance with the requirements set out in Appendix 4 .

(2) The district director may require any operator to conduct, at the operator's expense, dispersion modelling of boiler or process heater emissions.

(i) Section 31 is deleted in its entirety and replaced with the following:

31 (1) An operator of a boiler or process heater fuelled by biomass must conduct emission testing to determine concentrations of filterable particulate matter, carbon monoxide, nitrogen oxides, and total volatile organic compounds as provided in this section.

(2) Operators of new or modified boilers or process heaters fuelled by biomass must conduct emission testing required in subsection (1) within three months of commencing operation of the new or modified boiler or process heater, or as otherwise authorized by the district director, and at the intervals specified in subsection (4).

(3) Operators of existing boilers or process heaters fuelled by biomass must conduct emission testing required in subsection (1) within six months of the effective date of this Emission Regulation, and at the intervals specified in subsection (4).

(4) Operators of boilers or process heaters fuelled by biomass must conduct emission testing required in subsection (1) as follows:

(a) Once every calendar year with a minimum of 300 days and a maximum of 430 days between each emission test where facility capacity exceeds 1 MW.

(b) As may be required by the district director where facility capacity does not exceed 1 MW.

(5) The district director may vary the frequency of emission testing and the air contaminants to be tested for any operator.

(6) A minimum of three working days advance notice must be given prior to any emission testing. Notification must be given to Metro Vancouver at 604-436-6777.

(j) Section 32 is deleted in its entirety and replaced with the following:

32 (1) All emission testing under this Emission Regulation must be conducted while the boiler or process heater is operating at no less than 75% capacity and with operating conditions and fuel characteristics typical of the operations of that boiler or process heater over the preceding year, or as otherwise authorized by the district director.

(2) Operators must maintain a record of the type, source and amount of fuels burned during any emission test.

(k) Section 37 is deleted in its entirety and replaced with the following:

37 Emission test results under sections 30 or 31 must be submitted to the district director:

(1) within five working days of testing, if the test results indicate that any of the emission limits specified in Appendix 2 have been exceeded; or

(2) in any other case, within 60 days of testing.

(l) Section 38 is added as follows:

Continuous Emission Monitoring Requirements for boilers or process heaters fuelled by biomass

38 (1) An operator of a boiler or process heater fuelled by biomass where facility capacity exceeds 1 MW, must install and operate a Continuous Emission Monitoring System ("CEMS") at an appropriate location on any biomass boiler exhaust.

(2) The CEMS shall be installed, certified and operated in accordance with a Quality Assurance/Quality Control (QA/QC) plan approved by the district director.

(3) An operator of a boiler or process heater fuelled by biomass with a facility capacity that does not exceed 3 MW shall measure emissions of carbon monoxide and oxygen using the CEMS as required in this section.

(4) An operator of a boiler or process heater fuelled by biomass with a facility capacity exceeding 3 MW shall measure carbon monoxide, oxygen and opacity using the CEMS as required in this section.

(m) Section 39 is added as follows:

39 (1) An operator of a boiler or process heater fuelled by biomass where facility capacity does not exceed 1 MW, must install and operate a CEMS at an appropriate location on any biomass boiler exhaust.

(2) The CEMS shall be installed, certified and operated in accordance with a Quality Assurance/Quality Control (QA/QC) plan approved by the district director.

(3) An operator shall measure emissions of oxygen using the CEMS as required in this section.

(4) No operator of a boiler or process heater fuelled by biomass may discharge any air contaminants without adherence to a carbon monoxide monitoring plan approved by the district director.

(n) Section 40 is added as follows:

Tune-ups for boilers or process heaters fuelled by biomass

40 (1) An operator of a boiler or process heater fuelled by biomass must conduct a biennial performance tune-up according to procedures recommended by the boiler manufacturer and approved by the district director.

(2) Each biennial performance tune-up must be conducted no more than 26 months after the previous tune-up.

(o) Appendix 1 Table 1 is deleted in its entirety and replaced by the following:

Table 1 – Air Contaminant Emission Fees per Tonne of Air Contaminant

Column 1	Column 2
Air contaminant	Emission fee per tonne of air contaminant
Particulate Matter (filterable and condensable from combustion sources)	\$300
Nitrogen Oxides (NOx)	\$50
Total volatile organic compounds (photoreactive)	\$100
Total volatile organic compounds (non-photoreactive)	\$30

(p) Appendix 1 Subsection 2(2) is deleted in its entirety and replaced by the following:

2 (2) Unless otherwise specified by the district director, flue gases from boilers and process heaters fuelled by biomass are deemed to have the following concentrations of air contaminants for the purpose of emission fee calculations:

- a) Nitrogen oxides: 200 mg/m³;
- b) Condensable particulate matter: 15 mg/m³;
- c) Filterable particulate matter: 10 mg/m³;

- d) Total volatile organic compounds:
 - i) of which 9 mg/m³ are photoreactive, and
 - ii) 11 mg/m³ are non-photoreactive.

(q) Appendix 2 Section 2 is deleted in its entirety and replaced by the following:

Emission Limits for Boilers and Process Heaters Fuelled by Biomass

- 2 Operators of boilers or process heaters fuelled by biomass must not cause or allow the emissions from any boiler or process heater to exceed the emission limits specified in Table 2.

Table 2 – Emission Limits for Boilers and Process Heaters Fuelled by Biomass

Column 1	Column 2			
	Emission Limits			
Facility Capacity	Filterable Particulate Matter (mg/m ³)	Carbon monoxide (ppmv)	Total Volatile Organic Compounds (mg/m ³)	Opacity (%)
Greater than 3 MW	10	250	20	5
Less than or equal to 3 MW	18	250	20	5

(r) Appendix 3 is added as follows:

Appendix 3– Biomass Fuel Management Plan

A biomass fuel management plan must include but not be limited to the following:

- 1. Documented fuel specifications, including:
 - a. description of acceptable fuels (e.g., hog, sawdust, bark, clean woodwaste, etc),
 - b. acceptable fuel sizing (typical range), and
 - c. acceptable moisture content (typical range).

2. Quality assurance plan, including:
 - a. testing plan (including frequency and parameters),
 - b. visual inspection plan (i.e., inspection of pile, feed system), and
 - c. procedure for rejecting off-quality fuel.
3. Storage Plan, including:
 - a. maximum storage times, and
 - b. storage of off-quality materials.
4. Record Keeping Requirements, including:
 - a. fuel purchases (quantity, source),
 - b. fuel use (quantity, source), and
 - c. rejected loads and reason(s) for rejection.

(s) Appendix 4 is added as follows:

Appendix 4 – Dispersion Modelling for Boilers and Process Heaters Fuelled by Biomass

- 1 Any operator of a boiler or process heater fuelled by biomass must obtain district director approval and conduct air quality dispersion modelling prior to the discharge of any air contaminants.
- 2 Air quality dispersion modelling must be conducted according to the most recent version of the *Guidelines for Air Quality Dispersion Modelling in British Columbia* published by the British Columbia Ministry of Environment.
- 3 Any operator of a boiler or process heaters fuelled by biomass where facility capacity does not exceed 3 MW must determine the ambient concentrations of the air contaminants in Column 2 of Table 3 over the averaging time listed in Column 3 using, at minimum, a screening model assessment.
- 4 Any operator of a boiler or and process heater fuelled by biomass where facility capacity exceeds 3 MW must determine the ambient concentrations of the air contaminants in Column 2 of Table 3 over the averaging time listed in Column 3 using, at minimum, a refined model assessment.

Table 3 – Ambient Air Quality Criteria for Dispersion Modelling

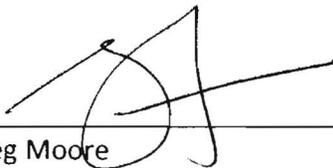
Column 1	Column 2	Column 3
Facility Capacity	Air contaminant	Averaging time(s)
≤ 3 MW	Nitrogen oxides (measured as NO ₂)	1-hour
	Inhalable particulate matter (PM ₁₀)	24-hour
	Fine particulate matter (PM _{2.5})	24-hour
>3 MW to 50 MW	Nitrogen oxides (measured as NO ₂)	1-hour and annual
	Inhalable particulate matter (PM ₁₀)	24-hour and annual
	Fine particulate matter (PM _{2.5})	24-hour and annual

2. This bylaw shall be cited as “Greater Vancouver Regional District Boilers and Process Heaters Emission Regulation Amending Bylaw No. 1190, 2013”.

READ A FIRST, SECOND AND THIRD TIME this 25 day of October, 2013.

RECONSIDERED, PASSED AND FINALLY ADOPTED this 25 day of October, 2013.


 Paulette Vetleson
 Corporate Officer


 Greg Moore
 Chair